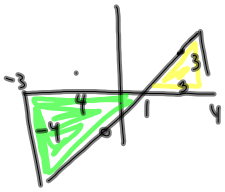
39. $\int_{-3}^{4} \frac{x^2-1}{x+1}\,dx$ integrand discontinuous at $x=-1$

$\int_{-3}^{4} \frac{(x+1)(x-1)}{x+1}\,dx = -8 + \frac{9}{2} = -\frac{7}{2}$

$\frac{1}{2}bh$



Nov 5-9:34 AM

5.3 Definite Integrals and Antiderivatives

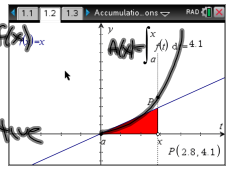
A function defined by a definite integral

$A(x) = \int_a^x f(t)\,dt$ $\frac{d}{dx}\int_a^x f(t)\,dt = f(x)$

$A'(x) = f(x)$

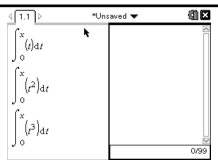
$A(x)$ is the antiderivative of $f(x)$

$A(x) = \int f(x)\,dx$



Nov 11-9:35 PM

Use FTC Discovery.tns to evaluate the following integrals and look for a pattern.



$\int_a^x t^2\,dt = \frac{x^3}{3} - \frac{a^3}{3}$

$\frac{t^3}{3}\Big|_a^x = \frac{x^3}{3} - \frac{a^3}{3}$

$\int_a^x \cos t\,dt = \sin t\Big|_a^x = \sin x - \sin a$

Nov 11-9:55 PM

Fundamental Theorem of Integral Calculus

FTC

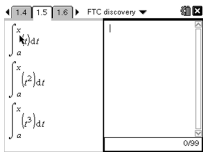
I $\frac{d}{dx}\int_a^x f(t)\,dt = f(x)$

II $\int_a^b f(x)\,dx = F(b) - F(a)$

where $F(x)$ is the antiderivative of $f(x)$

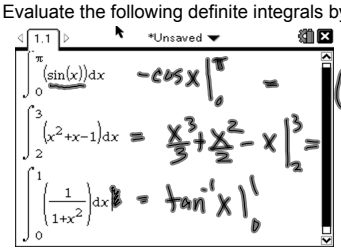
Nov 5-10:09 AM

Evaluate the following integrals and look for patterns



Nov 11-10:23 PM

Evaluate the following definite integrals by hand



$-\cos x\Big|_0^{\pi} = (-\cos\pi)-(-\cos 0) = 1+1=2$

$\left(\frac{3^3}{3}+\frac{3^2}{2}-3\right)-\left(\frac{2^3}{3}+\frac{2^2}{2}-2\right)$

$9+\frac{9}{2}-3-\frac{8}{3}-2+2$

$\frac{6\cdot 6}{6}+\frac{9}{2}-\frac{8}{3}\cdot\frac{3}{2}$

$\frac{36+27-16}{6}=\frac{47}{6}$

7.83

$= \tan^{-1}1-\tan^{-1}0$

$\frac{\pi}{4}-0=\frac{\pi}{4}$

Nov 11-10:28 PM

Nov 5-8:50 AM